

What is claimed is:

1. A laminate superconducting article comprising:
 - a. a substrate;
 - b. a biaxially textured buffer system on said substrate, said biaxially textured buffer system comprising at least an Ir buffer layer; and
 - c. an epitaxial layer of a superconductor on said biaxially textured buffer system.
2. A laminate superconducting article in accordance with claim 1 wherein at least a portion of said substrate comprises at least one of the group consisting of stainless steel, Cu, Ni, Fe, Al, Ag, and alloys of any of the foregoing.
3. A laminate superconducting article in accordance with claim 1 wherein at least a portion of said substrate comprises at least one of the group consisting of Ni-W, Ni-Cr, Ni-Cr-W, Ni-Cr-V, Ni-V, and Ni-Mn.
4. A laminate superconducting article in accordance with claim 1 wherein at least a portion of said substrate comprises at least one of the group consisting of MgO, SrTiO₃, and REAlO₃, where RE comprises at least one rare-earth element.
5. A laminate superconducting article in accordance with claim 1 wherein at least a portion of said substrate is characterized by at least one of the group of characteristics consisting of single crystal, biaxially textured, and untextured.
6. A laminate superconducting article in accordance with claim 1 wherein said Ir buffer layer is on said substrate.
7. A laminate superconducting article in accordance with claim 1 wherein said Ir buffer layer is on an intermediate layer, said intermediate layer being on said substrate.
8. A laminate superconducting article in accordance with claim 1 wherein said intermediate layer comprises TiN.

9. A laminate superconducting article in accordance with claim 1 wherein said buffer system further comprises the alloy $\text{Ir}_{1-x}\text{M}_x$ wherein M comprises at least one element selected from the group consisting of Ta, Ti, Cu, Pt, Pd, Ru, Rh, Os, Au, and Ag.
10. A laminate superconducting article in accordance with claim 1 wherein said buffer system further comprises:
 - a. a biaxially textured Ir buffer layer; and
 - b. at least one epitaxial buffer layer on said Ir buffer layer.
11. A laminate superconducting article in accordance with claim 10 wherein said Ir buffer layer further comprises the alloy $\text{Ir}_{1-x}\text{M}_x$ wherein M comprises at least one element selected from the group consisting of Ta, Ti, Cu, Pt, Pd, Ru, Rh, Os, Au, and Ag.
12. A laminate superconducting article in accordance with claim 10 wherein said Ir buffer layer is on said substrate.
13. A laminate superconducting article in accordance with claim 10 wherein said Ir buffer layer is on an intermediate layer, said intermediate layer being on said substrate.
14. A laminate superconducting article in accordance with claim 13 wherein said intermediate layer comprises TiN.
15. A laminate superconducting article in accordance with claim 10 wherein said buffer layer further comprises at least one buffer selected from the group consisting of TiN, CeO_2 , Y_2O_3 , SrTiO_3 , BaZrO_3 , BaSnO_3 , BaCeO_3 , YSZ, $(\text{RE}_{1-x}\text{Sr}_x)\text{MnO}_3$, REMnO_3 , RE_2O_3 , REAlO_3 , $\text{RE}_2\text{Zr}_2\text{O}_7$, RE_3NbO_7 , RESMO, and REMO where RE comprises at least one rare-earth element.
16. A laminate superconducting article in accordance with claim 10 wherein said buffer layer further comprises at least one buffer selected from the group consisting of LaNiO_3 , $\text{La}_{0.7}\text{Ca}_{0.3}\text{MnO}_3$, LaCoO_3 , $\text{La}_{0.5}\text{Sr}_{0.5}\text{TiO}_3$, SrRuO_3 , and La_2CuO_4 .

17. A laminate superconducting article in accordance with claim 1 wherein said buffer system further comprises:
 - a. a biaxially textured Ir buffer layer;
 - b. an epitaxial first buffer layer on said Ir buffer layer; and
 - c. an epitaxial second buffer layer on said first buffer layer.
18. A laminate superconducting article in accordance with claim 17 wherein said Ir buffer layer further comprises the alloy $\text{Ir}_{1-x}\text{M}_x$ wherein M comprises at least one element selected from the group consisting of Ta, Ti, Cu, Pt, Pd, Ru, Rh, Os, Au, and Ag.
19. A laminate superconducting article in accordance with claim 17 wherein said Ir buffer layer is on said substrate.
20. A laminate superconducting article in accordance with claim 17 wherein said Ir buffer layer is on an intermediate layer, said intermediate layer being on said substrate.
21. A laminate superconducting article in accordance with claim 20 wherein said intermediate layer comprises TiN.
22. A laminate superconducting article in accordance with claim 17 wherein said first buffer layer further comprises at least one buffer selected from the group consisting of TiN, CeO_2 , Y_2O_3 , SrTiO_3 , BaZrO_3 , BaSnO_3 , BaCeO_3 , YSZ, $(\text{RE}_{1-x}\text{Sr}_x)\text{MnO}_3$, REMnO_3 , RE_2O_3 , REAlO_3 , $\text{RE}_2\text{Zr}_2\text{O}_7$, RE_3NbO_7 , RESMO, and REMO where RE comprises at least one rare-earth element.
23. A laminate superconducting article in accordance with claim 17 wherein said first buffer layer further comprises at least one buffer selected from the group consisting of LaNiO_3 , $\text{La}_{0.7}\text{Ca}_{0.3}\text{MnO}_3$, LaCoO_3 , $\text{La}_{0.5}\text{Sr}_{0.5}\text{TiO}_3$, SrRuO_3 , and La_2CuO_4 .
24. A laminate superconducting article in accordance with claim 17 wherein said second buffer layer further comprises CeO_2 ,

25. A laminate superconducting article in accordance with claim 1 wherein said buffer system further comprises:
 - a. a biaxially textured Ir buffer layer;
 - b. an epitaxial first buffer layer on said Ir buffer layer;
 - c. an epitaxial second buffer layer on said first buffer layer;
 - d. an epitaxial third buffer layer on said second buffer layer; and
 - e. an epitaxial layer of a superconductor on said third buffer layer.
26. A laminate superconducting article in accordance with claim 25 wherein said Ir buffer layer further comprises the alloy $\text{Ir}_{1-x}\text{M}_x$ wherein M comprises at least one element selected from the group consisting of Ta, Ti, Cu, Pt, Pd, Ru, Rh, Os, Au, and Ag.
27. A laminate superconducting article in accordance with claim 25 wherein said Ir buffer layer is on said substrate.
28. A laminate superconducting article in accordance with claim 25 wherein said Ir buffer layer is on an intermediate layer, said intermediate layer being on said substrate.
29. A laminate superconducting article in accordance with claim 28 wherein said intermediate layer comprises TiN.
30. A laminate superconducting article in accordance with claim 25 wherein said first buffer layer further comprises at least one buffer selected from the group consisting of TiN, CeO_2 , Y_2O_3 , SrTiO_3 , BaZrO_3 , BaSnO_3 , BaCeO_3 , YSZ, $(\text{RE}_{1-x}\text{Sr}_x)\text{MnO}_3$, REMnO_3 , RE_2O_3 , REAlO_3 , $\text{RE}_2\text{Zr}_2\text{O}_7$, RE_3NbO_7 , RESMO, and REMO where RE comprises at least one rare-earth element.
31. A laminate superconducting article in accordance with claim 25 wherein said first buffer layer further comprises at least one buffer selected from the group consisting of LaNiO_3 , $\text{La}_{0.7}\text{Ca}_{0.3}\text{MnO}_3$, LaCoO_3 , $\text{La}_{0.5}\text{Sr}_{0.5}\text{TiO}_3$, SrRuO_3 , and La_2CuO_4 .
32. A laminate superconducting article in accordance with claim 25 wherein said second buffer layer further comprises YSZ.

33. A laminate superconducting article in accordance with claim 25 wherein said third buffer layer further comprises CeO_2 .
34. A laminate superconducting article in accordance with any one of claims 1-33, inclusive, wherein said superconductor comprises REBCO where RE comprises at least one rare-earth element.
35. A laminate superconducting article comprising:
 - a. a substrate comprising biaxially textured Ir;
 - b. a biaxially textured superconductor on said Ir substrate.
36. A laminate superconducting article in accordance with claim 35 wherein said Ir substrate further comprises the alloy $\text{Ir}_{1-x}\text{M}_x$ wherein M comprises at least one element selected from the group consisting of Ta, Ti, Cu, Pt, Pd, Ru, Rh, Os, Au, and Ag.
37. A laminate superconducting article in accordance with either of claims 34 or 35 wherein said superconductor comprises REBCO where RE comprises at least one rare-earth element.
38. A laminate superconducting article comprising:
 - a. a substrate comprising biaxially textured Ir;
 - b. a biaxially textured buffer system on said substrate; and
 - c. an epitaxial layer of a superconductor on said biaxially textured buffer system.
39. A laminate superconducting article in accordance with claim 38 wherein said biaxially textured Ir substrate further comprises the alloy $\text{Ir}_{1-x}\text{M}_x$ wherein M comprises at least one element selected from the group consisting of Ta, Ti, Cu, Pt, Pd, Ru, Rh, Os, Au, and Ag.
40. A laminate superconducting article in accordance with claim 38 wherein said biaxially textured buffer system further comprises at least one buffer selected from the group consisting of TiN, CeO_2 , Y_2O_3 , SrTiO_3 , BaZrO_3 , BaSnO_3 , BaCeO_3 , YSZ, $(\text{RE}_{1-x}\text{Sr}_x)\text{MnO}_3$,

REMnO₃, RE₂O₃, REAlO₃, RE₂Zr₂O₇, RE₃NbO₇, RESMO, and REMO where RE comprises at least one rare-earth element.

41. A laminate superconducting article in accordance with claim 38 wherein said biaxially textured buffer system further comprises at least one buffer selected from the group consisting of LaNiO₃, La_{0.7}Ca_{0.3}MnO₃, LaCoO₃, La_{0.5}Sr_{0.5}TiO₃, SrRuO₃, and La₂CuO₄.
42. A laminate superconducting article in accordance with claim 38 wherein said buffer system further comprises:
 - a. a biaxially textured first buffer layer on said biaxially textured Ir substrate; and
 - b. an epitaxial second buffer layer on said first buffer layer.
43. A laminate superconducting article in accordance with claim 42 wherein said first buffer layer further comprises at least one buffer selected from the group consisting of TiN, CeO₂, Y₂O₃, SrTiO₃, BaZrO₃, BaSnO₃, BaCeO₃, YSZ, (RE_{1-x}Sr_x)MnO₃, REMnO₃, RE₂O₃, REAlO₃, RE₂Zr₂O₇, RE₃NbO₇, RESMO, and REMO where RE comprises at least one rare-earth element.
44. A laminate superconducting article in accordance with claim 42 wherein said first buffer layer further comprises at least one buffer selected from the group consisting of LaNiO₃, La_{0.7}Ca_{0.3}MnO₃, LaCoO₃, La_{0.5}Sr_{0.5}TiO₃, SrRuO₃, and La₂CuO₄.
45. A laminate superconducting article in accordance with claim 42 wherein said second buffer layer further comprises CeO₂,
46. A laminate superconducting article in accordance with claim 38 wherein said buffer system further comprises:
 - a. a biaxially textured first buffer layer on said biaxially textured Ir substrate;
 - b. an epitaxial second buffer layer on said first buffer layer;
 - c. an epitaxial third buffer layer on said second buffer layer; and
 - d. an epitaxial layer of a superconductor on said third buffer layer.

47. A laminate superconducting article in accordance with claim 46 wherein said first buffer layer further comprises at least one buffer selected from the group consisting of TiN, CeO₂, Y₂O₃, SrTiO₃, BaZrO₃, BaSnO₃, BaCeO₃, YSZ, (RE_{1-x}Sr_x)MnO₃, REMnO₃, RE₂O₃, REAlO₃, RE₂Zr₂O₇, RE₃NbO₇, RESMO, and REMO where RE comprises at least one rare-earth element.
48. A laminate superconducting article in accordance with claim 46 wherein said first buffer layer further comprises at least one buffer selected from the group consisting of LaNiO₃, La_{0.7}Ca_{0.3}MnO₃, LaCoO₃, La_{0.5}Sr_{0.5}TiO₃, SrRuO₃, and La₂CuO₄.
49. A laminate superconducting article in accordance with claim 46 wherein said second buffer layer further comprises YSZ.
50. A laminate superconducting article in accordance with claim 46 wherein said third buffer layer further comprises CeO₂.
51. A laminate superconducting article in accordance with any one of claims 38-50, inclusive, wherein said superconductor comprises REBCO where RE comprises at least one rare-earth element.